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(56) Documents Cited by ISA

GB 1111234 A

EP 0291756 A

EP 0184766 A

DE 930002413 U

DE 001653227 A

US 3547742 A

(58) Field of Search by ISA

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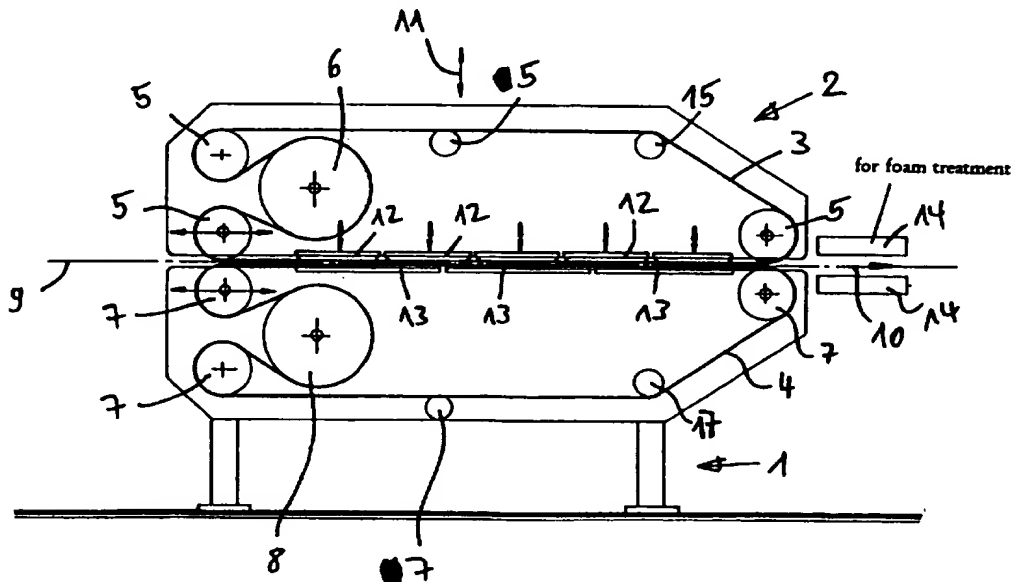
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(54) Continuous belt press

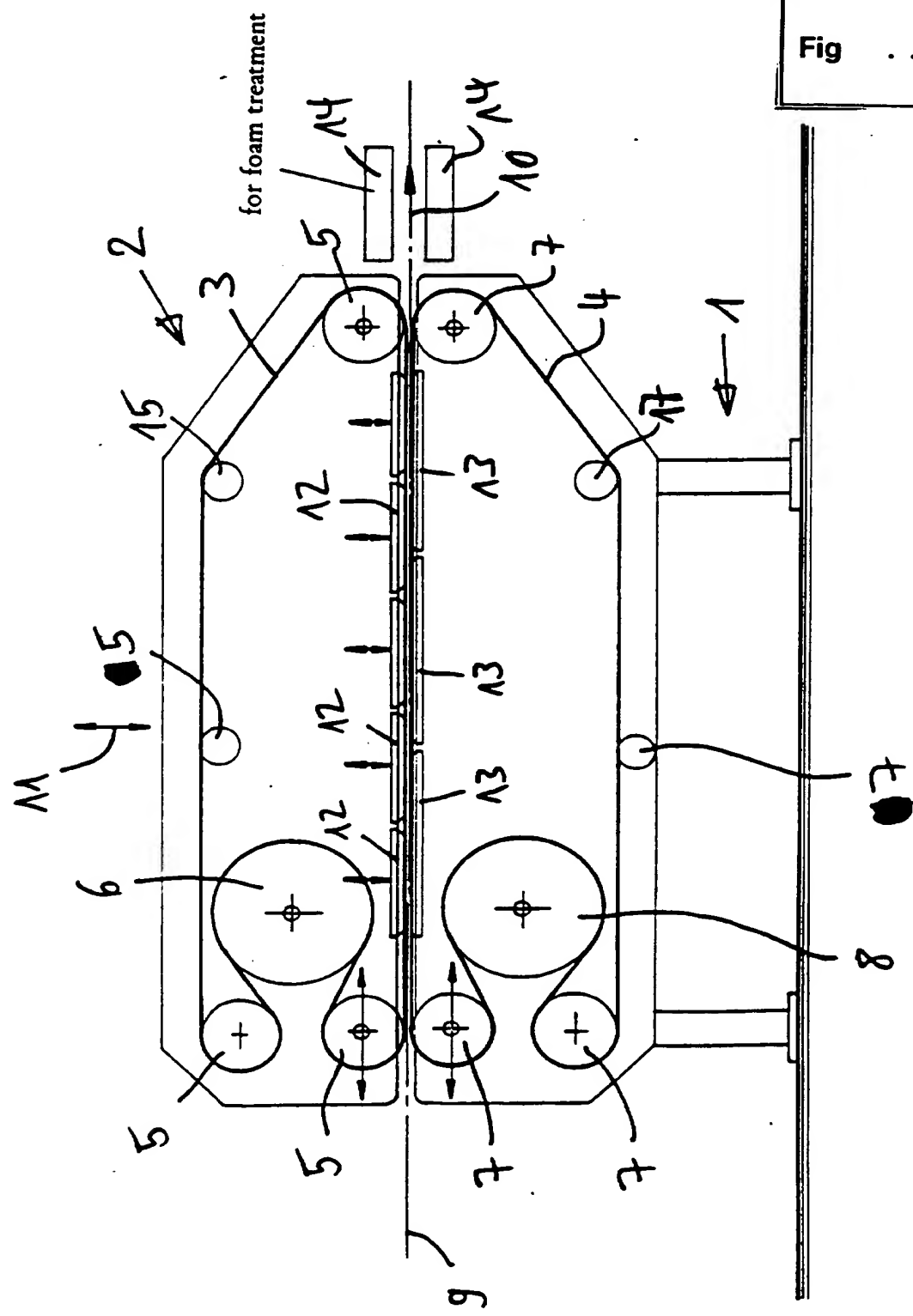
(57) A continuous belt press is used to press a bandlike material (9). It has two opposing circulating pressure belts (3,4) that are guided over deflection rollers (5) and that exert contact pressure on the bandlike material (9). To improve such a belt press, at least one of the deflection rollers (6, 8) can be temperature-controlled.



GB 2 294 660 A

Drawing to
accompany the
abstract on the GB
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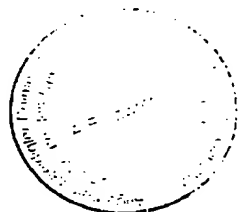
Fig 1



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Gernotstraße 10, 80804 Munich, Germany, a
publicly appointed translator hereby
certify that the following 8 page text is
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R. R. Lawrence

The said Arthur Richard Lawrence
this 4th day of December 1995.



A continuous Belt Press

The invention relates to a continuous belt press for the pressing of strip material comprising two oppositely arranged press belts, which are trained over bend rolls and are adapted to be pressed against the strip material.

Such belt presses are for instance employed for the hot embossing of pre-laminated composite materials. Preferably such belt presses are used for the processing of textile sheeting of all types, more particularly pre-laminated material.

A continuous belt press of the type initially mentioned is disclosed in the DE - OS 3,247,145. This known device comprises two oppositely placed, circulating metallic endless belts of a metal alloy. It serves for the production of duroplastic pressed laminates and furthermore plastic coated hard fiber board, wood fiber board, chip board, glass fiber reinforced sheeting and the like. The endless belts are held taut by two respective rolls in that part in which they are opposite each other and sandwich the web of material between them. In such part they furthermore run over heating plates..

The DE - OS 3,126,739 discloses a continuously operating press for the production of chip board, in which the top press platen can be moved upward and downward by hydraulic cylinders for setting the pressing nip and then arrested in the selected position. The circulating press belts are made of steel. The heating and, respectively, cooling plates of the bottom and top platens comprise a multiplicity of circulating roll shoes, able to be mounted and dismounted, which serve both a bearing means for the rolls and also as a device for the heating and, respectively, cooling system. In this respect the support bodies serve both as a running surface for the rolls circulating in the direction of the steel belt and also a heat storage means for heat transfer to the material being pressed. The input of heat to the support bodies is via heating and cooling tubes.

The DE - OS 3,208,728 discloses a device for the continu-

ous production of an amino-resin coated support web, that is to say a double belt press with two circulating endless pressing belts opposite to each other and trained over bend rolls to exert a flat pressing action on the multiply coated support webs - a textured film and a base foil - running between them to press them together as a laminate. In order to ensure a particularly even flat pressing action and to prevent air leaks, on the rear side of each pressing belt a plurality of pressure chambers are provided on a common pressing plate.

The US patent 4,402,778 discloses a double belt press with which a strip-like laminate material can be pressed. In that part, in which the pressing belts engage the strip-like material, compressed air chambers are mounted together with heating devices for heating the circulating pressing belts and accordingly also the resin impregnated laminate strip or web. A similar apparatus is disclosed in the US patent 4,420,359.

The US patent 3,801,407 also discloses a double belt press, which adjacent to the circulating pressing belts possesses hot air distributors, through which hot air may be fed to the circulating pressing belts with the result that the strip-like material may also be heated.

Prior art belt presses suffer from various disadvantages. Circulating metal belts of metal and more particularly of steel do offer the advantage of high thermal conduction. Therefore circulating pressing belts of a metal such as steel mean that the strip-like material is relatively well tempered, that is to say it is heated or cooled as may be necessary. Furthermore they are suitable for high pressures.

However pressing belts of metal such as steel are unsuitable for the processing of textiles, since they damage the pile thereof. Furthermore, belts of metal or, respectively, steel are comparatively expensive.

A further disadvantage of known belt presses is that tempering requires a highly involved system for performing it. In order to obtain satisfactory or good results for the processing of laminates, certain temperatures must be adhered to. The control of temperature is extremely important for the result of the process. Accordingly it is necessary to temper the strip-like material in the belt press, that is to say to cool or heat

same. For this purpose known constructions employ complex arrangements. Furthermore - owing to the high thermal conductivity - circulating pressing belts of a metal such as steel are required, which for the processing of webs of textile material possess the already described disadvantages.

One aim of the invention is to provide an improved continuous belt press of the type initially mentioned.

In accordance with the invention this aim is achieved since at least one bend roll is able to be tempered, that is to say able to be heated or cooled. The circulating pressing belt is heated or cooled by such bend roll. Preferably, the angle of wrap of the circulating pressing belt on the temperable bend roll is relatively large, as for instance in excess of 180° , in order to render possible the longest possible contact of the circulating pressing belt.

The circulating pressing belt then substantially or completely assumes the temperature of the temperable bend roll. It can then accordingly transfer heat to the strip-like material or take up heat from the strip-like material.

Means may be provided for conducting a heating or cooling fluid through the temperable bend roll. As a heating or cooling fluid steam, a functional fluid or hot water are particularly suitable. As a coolant use may be made of water from a refrigerating unit and/or brine.

Tempering of the circulating pressing belt by the temperable bend rolls may be developed by further measures. For instance, it is possible for the circulating belt to be heated by hot air or cooled by cooling air. Such tempered air may be directed by a nozzle chest onto the circulating belt. For heating or cooling the air it is possible to employ a heat exchanger.

A further advantage of the belt press in accordance with the invention resides in that complex and problematical roller chains, employed as a matter of necessity in prior art belt presses are not utilized.

Advantageous further development of the invention are described in the dependent claims.

Preferably the circulating belts are rubber belts or fabric belts, preferably with a rubber coating, or textile belts.

It is also possible to employ other suitable materials, as for example plastic materials. Since the circulating pressing belt is tempered by a bend roll, no belt of metal or of steel must be used. It is in fact possible to have a rubber belt or one of another material which gently handles the materials worked upon so that using the belt press in accordance with the invention means that it is more particularly possible to treat textiles as well in a satisfactory manner without damage.

A further advantageous development is characterized in that the circulating belt contacts the temperable bend roll on that side, which also contacts the belt strip-like material. The circulating pressing belt is accordingly so trained around the temperable bend roll that it has its "right" side in contact with the periphery of the temperable bend roll, namely on that side, which eventually comes into contact with the strip-like material being processed.

A still further advantageous development of the belt press is characterized in that a plurality of pressure plates are provided adjacent to the strip-like material. The distance of such pressure plate from one another is preferably adjustable. For this purpose lead screw drives may be employed. By setting to a particular distance a predetermined pressure will be produced, the degree of pressure increasing with a reduction in the distance between the pressure plates. Since a plurality of pressure plates is provided, it is possible to alter the height of the gap or nip so that the strip-like material is for example firstly able to enter a comparatively high gap, which then decreases in magnitude so that an increasingly high pressure will be built up and exerted.

One working embodiment of the invention will now be described in the following with reference to the accompanying drawing, whose

Single figure shows a double belt press in side elevation.

The double belt press 2 is mounted on a frame 1 comprises a top circulating pressing belt 3 and a bottom circulating pressing belt 4. The top pressing belt 3 runs around bend rolls 5 and around a temperable bend roll 6 with a larger diameter. The wrap angle of the belt 3 amounts to approximately

270 ° in the case of the temperable bend rolls 6. In an analogous fashion the bottom pressing belt 4 runs about bend rolls 7 and a temperable bend roll 8. The two oppositely placed, circulating pressing belts 3 and 4 sandwich the strip-like material 9 between them.

In the case of the circulating belts 3 and 4 it is a question of rubber belts. They are in contact with the temperable bends rolls 6 and 8 on that side thereof, which later comes into contact with the strip-like material 9 running through the double belt press 2 in the direction of the arrow 10.

As shown in the figure two oppositely arranged circulating pressing belts 3 and 4 are present. The top part of the double belt press 2, i. e. that part comprising the top belt 3 and the associated components, is able to be moved vertically in the direction of the double arrow, i. e. able to be raised and lowered.

Furthermore in the top part of the double belt press 2 in the lower portion, that is to say in the portion with the strip-like material 9 therein, a plurality (five) of pressure plates 12 is provided, which may be moved independently from one another in the vertical direction by lead screw drives (not illustrated) and may be locked in position. Opposite to the pressure plates 12 there are further pressure plates 13, which are located in the top portion of the bottom part of the double belt press 2. The in all three pressure plates 13 are not able to be adjusted. By changing the setting of the pressure plates 12 it is possible to alter the distance apart of the pressure plates 12 and 13. The greater the distance apart and therefore the greater the press nip, the smaller the pressure exerted on the strip-like material and vice versa.

The belts 3 and 4 are respectively passed through a belt straightening device 15 and 17.

In the top, horizontal portion of the belt 3 and/or in the bottom horizontal portion of the belt 4 it is possible to provide nozzle chests 4 (not illustrated in the drawing), through which the tempered (hot or cold) air is blown onto the belts 3 and 4 on the side thereof, which later comes into contact with the strip-like material 9.

In the direction 10 of motion behind the double belt press

2 a further tempering device 14 is provided, which in the present working embodiment comprises two radiative heaters with the strip-like material 9 running through them. Such radiative heaters are more particularly required to re-erect any foam present on the strip-like material, which has been flattened out in the double belt press 2 so that such foam will then resume its full thickness.

The continuous double belt press as shown in the figure is more particularly suitable for the processing of coated laminates.

Claims

1. A continuous belt press for the pressing of strip material (9) comprising two oppositely arranged circulating press belts (3 and 4), which are trained over bend rolls (5) and are adapted to be pressed against the strip material (9),

characterized in

that at least one bend roll (6 and 8) is temperable.

2. The belt press as claimed in claim 1, characterized in that the circulating belts (3 and 4) are rubber or fabric belts, preferably with a rubber coating or are textile belts.

3. The belt press as claimed in claim 1 or in claim 2, characterized in that the circulating belt (3 and 4) has that side thereof in contact with the temperable bend roll (6 and 8) which is also in contact with the strip-like material (9).

4. The belt press as claimed in any one of the preceding claims, characterized in that a plurality of pressure plates (12 and 13) is provided adjacent to the strip-like material (9).

5. The belt press as claimed in claim 4, characterized in that the distance apart of the pressure plates (12 and 13) is adjustable.

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/EP 95/01610

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B30B5/06 B27N3/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 B30B B27N B32B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | EP,A,0 184 766 (HELD KURT) 18 June 1986 see page 4, line 18 - page 5, line 29; figures 1,2 --- | 1,4,5 |
| X | EP,A,0 291 756 (HELD KURT) 23 November 1988 see the whole document --- | 1,4,5 |
| X | GB,A,1 111 234 (MILONE ET AL.) 24 April 1968 see the whole document --- | 1,2 |
| X Y | DE,U,93 02 413 (HELD) 3 June 1993 see claims; figures --- | 1,4,5 2 |
| Y | US,A,3 547 742 (COTTRELL EDWARD D) 15 December 1970 see column 2, line 21 - line 40; figures --- | 2 |
| -/-- | | |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

7 August 1995

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9
INTERNATIONAL SEARCH REPORT

Intern. Appl. No.
PCT/EP 95/01610

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|----------|--|-----------------------|
| A | <p>DE,A,16 53 227 (HOOVER BALL & BEARING CO.) 30 September 1971 see page 6, line 7 - line 23; claim 1; figures -----</p> | 3-5 |